Other: Residential Computer Modeling

Description

In addition to computer modeling changes that are part of other proposed measures, there are a number of refinements that will be considered for the 2005 *Standards*:

1. Slab edge. Consider calculating heat exchange using the average outdoor temperature for the previous week to more accurately calculate the impact of slab edges on the building loads.
2. Natural Ventilation. Consider modifying the operation of windows to better reflect occupant behavior with the opening/closing of windows once or twice in the evening and once or twice in the morning. The current modeling makes decisions every hour to open windows for ventilation, regardless of the time of day or the need for secure ventilation.
3. Dust Factor. Study the current dust factor used in fenestration solar gain calculations to determine if it needs to be recalibrated to adjust for other modeling changes. The dust factor scales the solar gain on windows to better account for dust and measured data that indicates that there is less solar heat gain in buildings than the calculated estimates.
4. Cool Roofs. Consider modifying the cool roof model to account for changes in the solar absorptivity based on the color of the roof and issues related to ventilation in the attic. Consider limiting the absorptivities allowed for compliance to a few key values discounted from tested values.
5. Basement Modeling. Refine the basement modeling procedure added in 1998 *Standards*. Consider calculating heat exchange using the average outdoor temperature for the past week.

Benefits

The proposed modeling changes will improve the accuracy of the compliance calculations, resolve compliance implementation issues, and help to properly value the demand and energy savings of energy efficiency features.

Environmental Impact

N/A

Type of Change

These changes would primarily be documented in the *ACM Manual*, with some minor changes to the *Residential Manual* as well.

Measure Availability and Cost

N/A

Useful Life, Persistence and Maintenance

N/A

Performance Verification

N/A

Cost Effectiveness

As these are modeling issues, there is no cost directly associated with these measures. However, these modeling changes can affect the cost effectiveness of all dwelling energy efficiency measures, as the estimates of energy use will change.

Analysis Tools

The modeling details in computer performance calculations affects all aspects of the *Standards'* development process. The best process would be to incorporate proposed changes into the computer performance method early in the process, so that the revised calculations can be used to establish the prescriptive packages based on their cost effectiveness. Eventually, all approved software will have to be modified to accommodate these proposed changes.

Relationship to Other Measures

To the extent that making these changes will modify the mix of heating and cooling energy, it will have an impact on the value of compliance measures. For example, changing the natural ventilation model will likely decrease the amount of cooling attributed to ventilation. This will increase the amount of mechanical cooling needed, making measures like low solar gain glass and higher air conditioner efficiency more attractive compliance features.

Bibliography and Other Research

Most of the changes proposed here are related to features contained in the current *ACM Manual*. Previous *Standards* and references such as the *ASHRAE Handbook of Fundamentals* will be used as needed.